

Claims

[1] An image data communication system, comprising:

an image data distribution device for sequentially distributing a plurality of sets of identical moving picture image data with prescribed time differences; and

5 an image data reception device for receiving moving picture image data that are distributed from said image data distribution device while moving among a plurality of radio areas;

wherein said image data reception device, at a time of handover that occurs when moving from a current radio area to another neighboring radio

10 area, receives over a prescribed interval said plurality of sets of identical moving picture image data having prescribed time differences that are distributed from said image data distribution device and selects necessary data from the received moving picture image data to reconstruct one set of moving picture image data.

[2] An image data communication system according to claim 1, wherein said plurality of sets of identical moving picture image data are a plurality of sets of encoded image data in which identical image data have been encoded by the same encoding method.

[3] An image data communication system according to claim 2, wherein:

5 said image data distribution device includes:
encoded image data transmission means for both sequentially transmitting
on a transmission line said plurality of sets of identical encoded image data

with prescribed time differences in at least said prescribed interval and, during this transmission, conferring to each of said plurality of sets of identical encoded image data information that is necessary for said reconstruction; and

10 said image data reception device includes:
 encoded image data reception means for receiving said plurality of sets of identical encoded image data having said prescribed time differences by way of said transmission line from said encoded image data transmission means; and

15 reconstruction means for referring to information necessary for said reconstruction that has been conferred to the encoded image data to reconstruct, as one set of encoded image data, said plurality of sets of identical encoded image data having said prescribed time differences that have been received in said encoded image data reception means.

[4] An image data communication system according to claim 3,
wherein:

 said image data distribution device further includes a control means for implementing prescribed control setting on said transmission line for said
5 plurality of sets of identical encoded image data having prescribed time differences that are transmitted from said encoded image data transmission means; and

 said control means performs said prescribed control setting such that during normal operation that excludes said prescribed interval, of said
10 plurality of sets of identical encoded image data having prescribed time differences, at least a prescribed set of encoded image data is received with

priority in said image data reception device; and sets said prescribed control such that during said prescribed intervals, said plurality of sets of identical encoded image data having prescribed time differences are both received in
15 said image data reception device.

[5] An image data communication system according to claim 4, wherein:

5 said image data reception device further includes a control information processing means for determining the start and end of said handover based on a reception state of encoded image data in said encoded image data reception means;

10 said control information processing means both transmits a start notification to said control means when said handover starts and transmits an end notification to said control means after the passage of a prescribed time interval from the end of said handover; and

15 said control means implements said prescribed control setting with the interval from the reception of said start notification until the reception of said end notification as said prescribed interval.

[6] An image data communication system according to claim 4, wherein:

5 said image data reception device further includes a control information processing means for determining the start of said handover based on the reception state of encoded image data in said encoded image data reception means;

10 said control information processing means transmits to said control means a first request to alter said prescribed control setting at the start of said handover, and transmits to said control means a second request to alter said prescribed control setting after the passage of a prescribed time interval from the end of said handover; and

 said control means performs said prescribed control setting with the interval from the reception of said first request until the reception of said second request as said prescribed interval.

[7] An image data communication system according to claim 4, wherein:

5 said image data reception device further includes a reception state report means for reporting the reception state of encoded image data in said encoded image data reception means to said image data distribution device at prescribed intervals; and

10 said control means determines the start and end of said handover based on reports of the reception state from said reception state report means, and implements said prescribed control setting with an interval that includes said handover interval and an interval from said end until the passage of a prescribed time interval as said prescribed interval.

[8] An image data communication system according to any one of claims 4 to 7, wherein said prescribed control setting is routing priority control on said transmission line.

[9] An image data communication system according to claim 8, wherein during said normal operation, said control means sets said routing priority that relates to, of said plurality of sets of identical encoded image data having prescribed time differences, said prescribed encoded image data higher than for other encoded image data; and during said prescribed interval, both sets said routing priority that relates to said prescribed encoded image data lower than during said normal operation and sets said routing priority that relates to said other encoded image data higher than during said normal operation.

[10] An image data communication system according to any one of claims 4 to 7, wherein said prescribed control setting is power control on a radio transmission line that is a portion of said transmission line.

[11] An image data communication system according to claim 10, wherein: during said normal operation, said control means sets power on said radio transmission line that relates to, of said plurality of sets of identical encoded image data having prescribed time differences, said prescribed encoded image data higher than for other encoded image data, and during said prescribed interval, both sets power on said radio transmission line that relates to said prescribed encoded image data lower than during said normal operation and sets power on said radio transmission line that relates to said other encoded image data higher than during said normal operation.

[12] An image data communication system according to any one of claims 4 to 7, wherein said prescribed control setting is the bit rate of encoded image data that are transmitted on said transmission line.

[13] An image data communication system according to claim 12, wherein: during said normal operation, said control means sets said bit rate that relates to, of said plurality of sets of identical encoded image data having prescribed time differences, said prescribed encoded image data 5 higher than for other encoded image data; and during said prescribed interval, both sets said bit rate that relates to said prescribed encoded image data lower than during said normal operation and sets said bit rate that relates to said other encoded image data higher than during said normal operation.

[14] An image data communication system according to claim 3, further including:

a radio network monitor device for monitoring the state of a radio transmission line that is a portion of said transmission line; and that, in 5 accordance with the state of said radio transmission line, implements prescribed control setting on said transmission line for said plurality of sets of identical encoded image data having prescribed time differences that are transmitted from said encoded image data transmission means;

wherein:

10 said radio network monitor device performs said prescribed control setting during normal operation that excludes said prescribed interval such that, of said plurality of sets of identical encoded image data having

prescribed time differences, at least prescribed encoded image data are received with priority in said image data reception device; and performs said
15 prescribed control setting during said prescribed interval such that said plurality of sets of identical encoded image data having prescribed time differences are received together in said image data reception device.

[15] An image data communication system according to claim 14, wherein said prescribed control setting is routing priority control in said transmission line.

[16] An image data communication system according to claim 15, wherein said radio network monitor device, during said normal operation, sets said routing priority that relates to, of said plurality of sets of identical encoded image data having prescribed time differences, said prescribed
5 encoded image data higher than other encoded image data, and during said prescribed interval, both sets said routing priority that relates to said prescribed encoded image data lower than during said normal operation and sets said routing priority relating to said other encoded image data higher than during said normal operation.

[17] An image data communication system according to claim 14, wherein said prescribed control setting is power control on a radio transmission line of said transmission line.

[18] An image data communication system according to claim 17, wherein said radio network monitor device, during said normal operation,

sets power on said radio transmission line that relates to, of said plurality of sets of identical encoded image data having prescribed time differences,
5 said prescribed encoded image data higher than for other encoded image data; and during said prescribed interval, both sets power on said radio transmission line that relates to said prescribed encoded image data lower than during said normal operation and sets power on said radio transmission line that relates to said other encoded image data higher than during said
10 normal operation.

[19] An image data communication system according to claim 3,
wherein:

5 said encoded image data transmission means is configured to allow multicast or broadcast distribution for each of a plurality of sets of identical encoded image data that are transmitted on said transmission line; and
said image data reception device further includes reception means for, during normal operation that excludes said prescribed interval, receiving multicast or broadcast traffic of at least prescribed encoded image data of said plurality of sets of identical encoded image data having prescribed time
10 differences, and during said prescribed interval, receiving multicast or broadcast traffic of each of said plurality of sets of identical encoded image data having prescribed time differences.

[20] An image data communication system according to claim 3,
wherein:

5 said encoded image data transmission means is configured to allow multicast distribution for each of said plurality of sets of identical encoded image data that are transmitted on said transmission line; and

10 said image data reception device further includes a multicast group joining/leaving means for, during normal operation that excludes said prescribed interval, joining the multicast group of at least prescribed encoded image data of said plurality of sets of identical encoded image data having prescribed time differences; and during said prescribed interval, joining the multicast groups of each of said plurality of sets of identical encoded image data having prescribed time differences.

[21] An image data distribution device that is connected so as to allow communication by way of a transmission line with an image data reception device that moves among a plurality of radio areas; said image data distribution device comprising:

5 encoded image data generation means for generating a plurality of sets of identical encoded image data in which identical image data are encoded;

10 encoded image data transmission means for sequentially transmitting on said transmission line a plurality of sets of identical encoded image data that have been generated by said encoded image data generation means with prescribed time differences; and

15 control means for implementing prescribed control setting on said transmission line such that, at a time of handover that occurs when said image data reception device moves from a current radio area to another neighboring radio area, said plurality of sets of identical encoded image data

having prescribed time differences that are transmitted from said encoded image data transmission means are received in said image data reception device over a prescribed interval.

[22] An image data distribution device according to claim 21, wherein said prescribed control setting is routing priority control on said transmission line.

[23] An image data distribution device according to claim 22, wherein said control means, during said normal operation that excludes said prescribed interval, sets said routing priority that relates to, of said plurality of sets of identical encoded image data having prescribed time differences, at least said prescribed encoded image data higher than for other encoded image data; and during said prescribed interval, both sets said routing priority that relates to said prescribed encoded image data lower than during said normal operation and sets said routing priority that relates to said other encoded image data higher than during said normal operation.

[24] An image data distribution device according to claim 21, wherein said prescribed control setting is power control on a radio transmission line that is a portion of said transmission line.

[25] An image data distribution device according to claim 24, wherein

 said control means, during said normal operation that excludes said prescribed interval, sets power on said radio transmission line that relates to,

5 of said plurality of sets of identical encoded image data having prescribed time differences, at least said prescribed encoded image data higher than for other encoded image data, and during said prescribed interval, both sets power on said radio transmission line that relates to said prescribed encoded image data lower than during said normal operation and sets power on said 10 radio transmission line that relates to said other encoded image data higher than during said normal operation.

[26] An image data distribution device according to claim 21, wherein said prescribed control setting is the bit rate of encoded image data that are transmitted on said transmission line.

[27] An image data distribution device according to claim 26, wherein said control means, during said normal operation that excludes said prescribed interval, sets said bit rate that relates to, of said plurality of sets of identical encoded image data having prescribed time differences, at least 5 said prescribed encoded image data higher than for other encoded image data; and during said prescribed interval, both sets said bit rate that relates to said first encoded image data lower than during said normal operation and sets said bit rate that relates to said other encoded image data higher than during said normal operation.

[28] An image data reception device that is connected so as to allow communication by way of a transmission line with an image data distribution device that sequentially distributes, with prescribed time

differences, a plurality of sets of identical encoded image data in which
5 identical images are encoded; said image data reception device comprising:
encoded image data reception means for receiving over a prescribed interval
said sets of identical encoded image data having prescribed time differences
that are distributed from said image data distribution device at a time of a
handover that occurs when moving from a current radio area to another
10 neighboring radio area; and
a data reconstruction means for selecting necessary data from said
sets of identical encoded image data having prescribed time differences that
have been received over said prescribed interval to reconstruct one set of
encoded image data.

[29] An image data distribution device according to claim 28,
wherein:

said image data distribution device performs multicast or broadcast
distribution of each of said plurality of sets of identical encoded image data;
5 and
said image data reception device further includes means for, during
normal operation that excludes said prescribed interval, receiving multicast
or broadcast traffic of at least prescribed encoded image data of said
plurality of sets of identical encoded image data having prescribed time
10 differences; and during said prescribed interval, receiving multicast or
broadcast traffic of each of said plurality of sets of identical encoded image
data.

[30] An image data distribution device according to claim 28,
wherein:

 said image data distribution device performs multicast or broadcast
 distribution of each of said plurality of sets of identical encoded image data;

5 and

 said image data distribution device further includes a multicast group
 joining/leaving means for, during normal operation that excludes said
 prescribed interval, joining multicast groups of at least prescribed encoded
 image data of said plurality of sets of identical encoded image data having
10 prescribed time differences; and during said prescribed interval, joining
 multicast groups of each of said plurality of sets of identical encoded image
 data.

[31] An image data communication method carried out in a
communication system in which an image data distribution device and an
image data reception device are connected so as to allow communication by
way of a transmission line; said image data communication method
5 comprising:

 a first step in which said image data distribution device sequentially
 distributes a plurality of sets of identical moving picture image data with
 prescribed time differences to said image data reception device; and

 a second step in which said image data reception device, at a time of
10 handover that occurs when moving from a current radio area to another
 neighboring radio area, receives over a prescribed interval said plurality of
 sets of identical moving picture image data having prescribed time
 differences that have been distributed from said image data distribution

device, and selects necessary data from the moving picture image data that
15 have been received to reconstruct one set of moving picture image data.

[32] An image data communication method according to claim 31,
wherein:

5 said first step includes a step in which said image data distribution device, when transmitting said plurality of sets of identical moving picture image data, confers to each of said plurality of sets of identical moving picture image data information necessary for said reconstruction; and

10 said second step includes a step in which said image data reception device refers to said information necessary for said reconstruction that has been conferred to said moving picture image data to reconstruct said plurality of sets of identical moving picture image data having prescribed time differences that have been distributed from said image data distribution device in said prescribed interval as one set of moving picture image data.

[33] An image data communication method according to claim 31,
wherein said first step includes:

5 a step in which said image data distribution device, during normal operation that excludes said prescribed interval, performs prescribed control setting in said transmission line such that, of said plurality of sets of identical moving picture image data having prescribed time differences, at least prescribed moving picture image data are received with priority in said image data reception device; and

10 a step in which said image data distribution device, during said prescribed interval, performs said prescribed control setting such that said

plurality of sets of identical moving picture image data having prescribed time differences are received together in said image data reception device.

[34] An image data communication method according to claim 33, wherein:

said second step includes:

5 a step in which said image data reception device determines the start and end of said handover based on the reception state of said moving picture image data; and

10 a step in which said image data reception device both transmits to said image data distribution device a start notification when said handover starts and transmits to said image data distribution device an end notification after the passage of a prescribed time interval from the end of said handover; and

said first step includes:

15 a step in which said image data distribution device implements said prescribed control setting with the interval from the reception of said start notification until reception of said end notification as said prescribed interval.

[35] An image data communication method according to claim 33, wherein:

said second step includes:

5 a step in which said image data reception device determines the start and end of said handover based on the reception state of said moving picture image data; and

a step in which said image data reception device transmits to said image data distribution device a first request to alter said prescribed control setting when said handover starts, and transmits to said image data reception device a second request to alter said prescribed control setting after the passage of a prescribed time interval from the end of said handover; and

10 said first step includes:

a step in which said image data distribution device performs said

15 prescribed control setting with the interval from the reception of said first request until the reception of said second request as said prescribed interval.

[36] An image data communication method according to claim 33, wherein:

said second step includes a step in which said image data reception device reports to said image data distribution device at prescribed time

5 intervals the reception state of said moving picture image data; and

said first step includes a step in which said image data distribution device determines the start and end of said handover based on the reports of reception state from said image data reception device, and performs said prescribed control setting with the interval that includes the interval of said

10 handover and the interval from said end until the passage of a prescribed time interval as said prescribed interval.

[37] An image data communication method according to any one of claims 33 to 36, wherein said prescribed control setting is control of routing priority on said transmission line.

[38] An image data communication method according to claim 37, wherein said first step includes a step in which said image data distribution device, during said normal operation, sets said routing priority that relates to said prescribed moving picture image data of said plurality of sets of identical moving picture image data having prescribed time differences higher than for other moving picture image data, and during said prescribed interval, both sets said routing priority that relates to said prescribed moving picture image data lower than during said normal operation and sets said routing priority that relates to said other moving picture image data higher than during said normal operation.

[39] An image data communication method according to any one of claims 33 to 36, wherein said prescribed control setting is power control on a radio transmission line of said transmission line.

[40] An image data communication method according to claim 39, wherein said first step includes a step in which said image data distribution device, during said normal operation, sets power on said radio transmission line that relates to said prescribed moving picture image data of said plurality of sets of identical moving picture image data having prescribed time differences higher than for other moving picture image data, and during said prescribed interval, both sets power on said radio transmission line that relates to said prescribed moving picture image data lower than during said normal operation and sets power on said radio transmission line that relates

10 to said other moving picture image data higher than during said normal operation.

[41] An image data communication method according to any one of claims 33 to 36, wherein said prescribed control setting is the bit rate of encoded image data that are transmitted on said transmission line.

[42] An image data communication method according to claim 41, wherein in said first step, said image data distribution device, during said normal operation, sets said bit rate that relates to said prescribed moving picture image data of said plurality of sets of identical moving picture image data having prescribed time differences higher than for other moving picture image data, and during said prescribed interval, both sets said bit rate that relates to said prescribed moving picture image data lower than during said normal operation and sets said bit rate that relates to said other moving picture image data higher than during said normal operation.

[43] An image data communication method according to claim 31, further comprising:

a third step in which a radio network monitor device for monitoring the state of a radio transmission line that is a portion of said transmission line 5 performs prescribed control setting on said transmission line for sets of identical moving picture image data that are transmitted from said image data distribution device in accordance with the state of said radio transmission line; and

10 a fourth step in which said radio network monitor device, during
normal operation that excludes said prescribed interval, performs said
prescribed control setting such that at least prescribed moving picture image
data of said plurality of sets of identical moving picture image data having
prescribed time differences are received with priority in said image data
reception device; and during said prescribed interval, performs said
15 prescribed control setting such that said plurality of sets of identical moving
picture image data having prescribed time differences are received together
in said image data reception device.

[44] An image data communication method according to claim 43,
wherein said prescribed control setting is control of routing priority on said
transmission line.

[45] An image data communication method according to claim 44,
further including a step wherein said radio network monitor device, during
said normal operation, sets said routing priority that relates to said
prescribed moving picture image data of said plurality of sets of identical
5 moving picture image data having prescribed time differences higher than for
other moving picture image data; and during said prescribed interval, both
sets said routing priority that relates to said prescribed moving picture image
data lower than during said normal operation and sets said routing priority
that relates to said other moving picture image data higher than during said
10 normal operation.

[46] An image data communication method according to claim 43, wherein said prescribed control setting is power control on a radio transmission line of said transmission line.

[47] An image data communication method according to claim 46, further including a step wherein said radio network monitor device, during said normal operation, sets the power on said radio transmission line that relates to said prescribed moving picture image data of said plurality of sets 5 of identical moving picture image data having prescribed time differences higher than for other moving picture image data; and during said prescribed interval, both sets power on said radio transmission line that relates to said prescribed moving picture image data lower than during said normal operation and sets power on said radio transmission line that relates to said 10 other moving picture image data higher than during said normal operation.

[48] An image data communication method according to claim 31, further including:

a step wherein said image data distribution device performs multicast or broadcast distribution of each of said plurality of sets of identical moving 5 picture image data having prescribed time differences; and a step wherein said image data reception device, during normal operation that excludes said prescribed interval, receives multicast or broadcast traffic of at least prescribed moving picture image data of said plurality of sets of identical moving picture image data having prescribed time 10 differences, and during said prescribed interval, receives multicast or

broadcast traffic of each of said plurality of sets of identical moving picture image data having prescribed time differences.

[49] An image data communication method according to claim 31, further including:

a step wherein said image data distribution device performs multicast distribution of each of said plurality of sets of identical moving picture image data having prescribed time differences; and

a step wherein said image data reception device, during normal operation that excludes said prescribed interval, joins a multicast group of at least prescribed moving picture image data of said plurality of sets of identical moving picture image data having prescribed time differences, and

10 during said prescribed interval, joins each multicast group of said plurality of sets of identical moving picture image data having prescribed time differences.

[50] An image data communication method according to any one of claims 31 to 49, wherein said plurality of sets of identical moving picture image data are a plurality of sets of encoded image data in which identical image data are encoded by the same encoding method.

[51] A program that is used in a communication system in which a server and a client terminal are connected so as to allow communication by way of a transmission line, said program:

causing a computer of said server to execute a first process for
5 sequentially distributing a plurality of sets of identical moving picture image
data with prescribed time differences to said client terminal; and
causing a computer of said client terminal to execute a second
process for, at a time of handover that occurs when moving from a current
radio area to another neighboring radio area, receiving over a prescribed
10 interval said plurality of sets of identical moving picture image data having
prescribed time differences that are distributed from said server, and
selecting necessary data from the received moving picture image data to
reconstruct one set of moving picture image data.

[52] A program that is used in a server that is connected so as to
allow communication by way of a transmission line with a client terminal that
moves among a plurality of radio areas, said program causing a computer of
said server to execute:

5 a first process for generating a plurality of sets of identical encoded
image data in which identical image data are encoded;
a second process for sequentially transmitting on said transmission
line with prescribed time differences a plurality of sets of identical encoded
image data that have been generated in said first process; and
10 a third process for, at a time of handover that occurs when said client
terminal moves from a current radio area to another neighboring radio area,
performing prescribed control setting on said transmission line such that said
plurality of sets of identical encoded image data having prescribed time
differences that are transmitted in said second process are received in said
15 client terminal over a prescribed interval.

[53] A program according to claim 52, wherein said prescribed control setting is routing priority control on said transmission line.

[54] A program according to claim 53, said program causing the computer of said server to further execute processes for:

 during normal operation that excludes said prescribed interval, setting said routing priority that relates to at least prescribed encoded image data of
5 said plurality of sets of identical encoded image data having prescribed time differences higher than for other encoded image data; and

 during said prescribed interval, both setting said routing priority that relates to said prescribed encoded image data lower than during said normal operation and setting said routing priority that relates to said other encoded
10 image data higher than during said normal operation.

[55] A program according to claim 52, wherein said prescribed control setting is power control on a radio transmission line that is a portion of said transmission line.

[56] A program according to claim 55, said program causing the computer of said server to further execute processes for:

 during normal operation that excludes said prescribed interval, setting power on said radio transmission line that relates to at least prescribed
5 encoded image data of said plurality of sets of identical encoded image data having prescribed time differences higher than for other encoded image data; and

10 during said prescribed interval, both setting said power on said radio transmission line that relates to said prescribed encoded image data lower than during said normal operation and setting power on said radio transmission line that relates to said other encoded image data higher than during said normal operation.

[57] A program according to claim 52, wherein said prescribed control setting is the bit rate of encoded image data that are transmitted on said transmission line.

[58] A program according to claim 57, said program causing the computer of said server to further execute processes for:

5 during normal operation that excludes said prescribed interval, setting said bit rate that relates to at least prescribed encoded image data of said plurality of sets of identical encoded image data having prescribed time differences higher than for other encoded image data; and

10 during said prescribed interval, both setting said bit rate that relates to said first encoded image data lower than during said normal operation and setting said bit rate that relates to said other encoded image data higher than during said normal operation.

[59] A program that is used in a client terminal that is connected so as to allow communication by way of a transmission line with a server that sequentially distributes with prescribed time differences a plurality of sets of identical encoded image data in which identical images are encoded; said 5 program causing a computer of said client terminal to execute processes for:

at a time of handover that occurs when moving from a current radio area to another neighboring radio area, receiving over a prescribed interval said plurality of sets of identical encoded image data having prescribed time differences that are distributed from said server; and

10 selecting necessary data from said plurality of sets of identical encoded image data having prescribed time differences that have been received over said prescribed interval to reconstruct one set of encoded image data.

[60] A program according to claim 59, wherein said program causes the computer of said client terminal to further execute processes for:

multicast or broadcast distribution of each of said plurality of sets of identical encoded image data; and

5 during normal operation that excludes said prescribed interval, receiving multicast or broadcast traffic of at least prescribed encoded image data of said plurality of sets of identical encoded image data having prescribed time differences, and during said prescribed interval, receiving multicast or broadcast traffic for each of said plurality of sets of identical encoded image

10 data.

[61] A program according to claim 59, wherein said program causes the computer of said client terminal to further execute processes for:

multicast distribution of each of said plurality of sets of identical encoded image data; and

5 during normal operation that excludes said prescribed interval, joining a multicast group of at least prescribed encoded image data of said plurality

of sets of identical encoded image data having prescribed time differences; and during said prescribed interval, joining multicast groups of each of said plurality of sets of identical encoded image data.